

CLAIMS

1. An automatic door apparatus comprising:
 - a pair of doors opening and closing by moving on a same vertical plane;
 - a pair of moving means for moving the pair of doors individually;
 - control means for controlling the pair of moving means;
 - a pair of two-dimensional image sensors for detecting a moving object at both sides of the pair of doors; and
 - a pair of spare sensors for detecting a moving object at both sides of the pair of doors,
- wherein the control means includes:
 - moving status calculating means for calculating a position and a moving direction of a moving object by image processing of outputs of the two-dimensional image sensors;
 - opening degree calculating means
 - for predicting a passing position of the moving object on the vertical plane on the basis of the position and moving direction of the moving object calculated by the moving status calculating means and
 - calculating a target opening degree of each of the doors on the basis of the predicted passing position when the moving object approaches, and
 - for determining the target opening degrees

of the doors in fully closed state when the moving object moves away;

first move command means for outputting move command signals to the pair of moving means so that the doors may be opened to the calculated target opening degrees; and

second move command means for outputting move command signals to the pair of moving means to open or close the doors fully in accordance with outputs from the spare sensors in the event of image processing failure of the moving status calculating means.

2. An automatic door apparatus according to claim 1, wherein the control means immediately outputs a door full opening move command signal to the pair of moving means by the second move command means, if the moving status calculating means cannot calculate the position and moving direction of the moving object due to failure of the image processing of individually recognizing the moving object.

3. An automatic door apparatus according to claim 1 or 2, wherein the control means selects a largest opening degree, as the target opening degree of the door, from plural target opening degrees corresponding to plural moving objects calculated by the opening degree calculating means.

4. An automatic door apparatus according to any one of claims 1 to 3, wherein the moving status calculating

means has opening speed calculating means for calculating a moving speed of each moving object and calculating an opening speed of the doors on the basis of the fastest moving speed among the calculated moving speeds, and the first move command means outputs a move command signal so as to open the doors at the opening speed.

5. An automatic door apparatus according to any one of claims 1 to 4, wherein a zone detected by the two-dimensional image sensor includes a first zone remote from the doors, and a second zone adjacent to the first zone and closer to the doors than the first zone,

the moving status calculating means calculates the moving status of the moving object on the basis of the motion of the moving object in the first zone, and

the opening degree calculating means calculates the target opening degree when the moving object moves from the first zone to the second zone, and the first move command means outputs the move command signal.

6. An automatic door apparatus according to any one of claims 1 to 4, wherein a zone detected by the two-dimensional image sensor includes a first zone remote from the doors, and a second zone adjacent to the first zone and closer to the doors than the first zone, and

the opening status calculating means sets the target opening degree in full closing when the moving object moves from the second zone to the first zone, and the first move command means outputs the move command signal.